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Land, Credit, and Irrigation Policy in Mexico

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The Mexican Government is taking an active part in trying to improve the agricultural life of its people. The idea of close Government cooperation now applies to other sections of the economy also, resulting in national planning for mineral and industrial development as well. Government action in agriculture was first taken in the field of land reform and was combined with irrigation projects to increase the amount of arable land, provision of agricultural credit facilities, tariff protection on agricultural products, encouragement of cooperatives, stimulation of increased production through price guaranties and subsidies, measures to improve the livestock industry, and numerous other services designed to improve agricultural techniques and raise the standard of living of the farm population. This article will discuss briefly the experience in land reform, irrigation, agricultural credit, the 6-year plans, improvement in agricultural methods, and cooperation with the United States. A later paper will cover production, internal marketing, and foreign-trade policies.

With 70 percent of its gainfully employed people making their living from the land, Mexico is particularly interested in what happens to agriculture. Many of these farmers are crowded onto the southern part of the central plateau in the relatively level stretches between mountain ranges. Rainfall there is greater than in the vast arid plains to the north, but even so it is not always adequate for the growing crops. Partly because of the broken terrain but largely because of scanty rainfall, only about a tenth of the total land area of the country is presently classed as arable. Pastures or ranges occupy almost 45 percent and productive noncultivated crops make up another 7 percent of the total area. Extension of irrigation works, transportation systems, and the like would probably enable cultivation of parts of these last two areas.

Background

RESOURCES

The central plateau reaches an elevation of about 7,500 feet in the south around Mexico City and slopes toward the north or Mesa del Norte, which seems to be a continuation of the central basin of

the United States. Two mountain ranges form the east and west borders of the plateau, the Sierra Madre Oriental on the east and the Sierra Madre Occidental on the west. Between the mountains and the sea on either side are narrow coastal plains. Another highland region—the Sierra Madre del Sur—lies south of the central plateau. The most extensive lowland area is the Peninsula of Yucatán.

Altitude plays a predominant part in determining temperature. The range from one season to another is great in northern Mexico, whereas in the higher altitudes of the central plateau the temperature is relatively uniform through the year. Rainfall varies widely from one region to another and from one season to another. On the Sonora desert, for example, annual rainfall averages only 2 inches, whereas in parts of the tropical lowlands it averages 185 inches. Most of the rain falls from May through September, with little precipitation during the remainder of the year. Lack of sufficient moisture in many places and poor distribution of rainfall combine to constitute one of the major problems of the Mexican farmer.

The central plateau is the great food- and grain-growing section, the Yucatán Peninsula is noted for its henequen, the west coast produces winter vegetables, the State of Veracruz is the important sugar producer, cotton grows on the Mesa del Norte, and coffee on the hillsides in Veracruz and Chiapas. Of the wide variety of products grown, corn is the most important. This mainstay of the Mexican diet accounted for almost one-quarter of the value of agricultural production in 1940 and occupied more than half the acreage devoted to crop production. Cotton (plus cottonseed), wheat, and sugarcane were the next most valuable crops, but beans, also important from the standpoint of the food supply, were second in acreage cultivated. Foods—grain, vegetables, fruits, sugar—are grown for use within the country. Domestic production must be supplemented by imports of grain and sometimes sugar. Henequen and other fibers, winter vegetables, cattle, vanilla, and bananas go into export trade, most of them to the United States to supplement or complement production there.

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SOCIAL AND ECONOMIC CONDITIONS

From the time the Spaniards first seized Indian lands in the name of the Spanish Crown, the problems of the farmer on the land have been in the forefront of Mexican life. Fundamental to the fight for independence in the early part of the nineteenth century was the system of land tenure, which was blamed for many social and economic ills. Independence failed to give the peasants much relief from the system of land monopoly, which had resulted from large grants during the colonial era, but the principle of the right of the people to the land was enunciated.

By 1910, however, only 2 percent of the rural people owned 70 percent of the total area. Virtual peonage on the haciendas of absentee landowners was characteristic of much of the rural population. Farm workers began to see their urban brothers improving their status in industrial employment, whereas farm life became more and more precarious. The time was ripe for revolution. The 1910 revolution was an agrarian uprising, and the resulting constitution of 1917 embodied and elaborated the earlier concept of land tenure. This constitution became the legal basis, first for land reform, and later for other Government aids to agriculture, including credit legislation and establishment of the Irrigation Commission in 1926, the monopoly laws of 1934, the Agrarian Codes, and the two 6-year plans.

Interwoven with these is a multitude of production and marketing policies, price controls, trade controls, and other regulatory activities. Similar to agricultural aids in the United States, the overlapping legislative authority and operating procedure make it difficult to trace the history of many of them. On the other hand, several excellent studies have been published on certain phases of Mexico's experience in agricultural planning. The present study, therefore, summarizes briefly some of the outstanding developments and lays the groundwork for later, more detailed analyses of specific portions of the agricultural policy.

Agrarian Policy

One of the first steps in the peasants' long struggle for land was an act of 1823 which permitted the breaking up of large estates.¹ But not

until 1856, under the leadership of Benito Juárez, were there many concrete results. The law of expropriation passed in that year provided that real estate held by religious or civil corporations, not "used directly for civil or religious purposes, should be sold to tenants or lessees at stipulated prices."² The constitution adopted in the following year embodied the principles of the earlier law and in addition prohibited civil and religious corporations from owning and administering any real property, except buildings devoted exclusively to purposes for which those bodies existed.

Although the laws were intended to break up large estates and create a class of small landholders, progress toward these goals was slow. Industry, mining, rail construction, and public works expanded rapidly with the advent of Dictator Porfirio Díaz in 1876, but the lot of the peasant was not improved. Under a law passed in 1883, the Government of Mexico contracted with engineering companies to survey public lands for colonization purposes. The companies received as payment an outright grant of one-third of the land surveyed and the privilege of buying the other two-thirds at low prices. Much of the public domain, as well as lands previously held by the villages, was concentrated in these companies, some of which were Mexican-owned and some foreign-owned.³

Instead of creating a class of small landowners, this policy worked in the opposite direction. Three principal types of land tenure were clearly discernible: The hacienda or large estate, the rancho or small farm, and the landholding village. Village holdings decreased during the Díaz regime, whereas large-estate ownerships increased.

THE AGRARIAN REVOLUTION

Dictator Díaz was overthrown by the agrarian uprising in 1910, but not until 1915 was a new legal basis for agrarian reform established. The act of January 6, 1915, and article 27 of the 1917 constitution form the legal framework of the reform. The decree of 1915 provided that certain types of villages having political status—*pueblos*, *rancherías*, *congregaciones*, and *comunidades*—could petition for restoration of lands that had been taken from them in earlier years. If such villages could not prove clear title to lands, they could petition for a grant or *dotación* from the

² BARBER, CHARLES H. THE LAND PROBLEM IN MEXICO. Foreign Agr. 3: 99-120, illus. 1939.

³ SIMPSON, EYLER N. THE EJIDO, MEXICO'S WAY OUT. 849 pp., illus. Chapel Hill [N. C.] 1937.

¹ MUNGUÍA, ENRIQUE. THE AGRARIAN PROBLEM OF MEXICO. Internatl. Labour Rev. 36: [49]-85; [200]-238, illus. 1937.

National Government, which in turn could expropriate the necessary lands from those immediately adjoining the petitioning community.

Machinery for carrying out these provisions consisted of a newly established National Agrarian Commission, State Agrarian Commissions in each State, and special executive committees in the local communities. This emergency measure soon gave way to article 27 of the constitution, which recognized the earlier decree and provided further for the creation of new centers of population, the division of large estates, and interior colonization. Villages were permitted to petition solely on the basis of need for *dotación* of land. They could apply not only for land contiguous to the community but also for land anywhere in the vicinity. Such land, including water and woods, granted to a community constitutes an *ejido*.

The holders of land restored to the villages (under *restitución*) received no payment. Those owning land expropriated and donated (*dotación*) to petitioning villages were, however, authorized to receive a sum equal to the value of the property for tax purposes, plus 10 percent. Article 27 enunciates the national conception of private property controlled in the public interest:⁴

The ownership of lands and waters comprised within the limits of the national territory is vested originally in the nation, which has had, and [still] has, the right to transmit title thereof to private persons, thereby constituting private property.

Expropriation shall only take place for reasons of public utility and by means of indemnification.

The nation shall have, at all times, the right to impose on private property such limitations as the public interest may demand.

LAND DISTRIBUTION

From 1915 until 1933 the distribution of lands to ejidos had only indifferent success. A mass of legislation and regulations covering interpretation and procedure grew up, part of it hampering rather than aiding the distribution. By the end of 1933 land distributed under all types of grants to ejidos totaled 18,841,000 acres involving approximately 4,260 ejidos and 754,577 ejidatarios.⁴ This compares with more than 24,000 communities (in 1930) having legal right to petition.

Also under the authority of the constitution of 1917, the Government recovered large tracts of

public lands previously held by surveying companies and others and made allotments to small landholders under homestead legislation. The area of public land totaled 56,393,000 acres in 1912. By the end of 1933, it had been increased to 98,368,000 acres, and 3,863,000 acres had been distributed to 9,159 settlers under the homestead law of 1923. Under the colonization law of 1926, 4,068 colonists had received 1,966,000 acres of land. The 1926 irrigation law also provided for individual colonization.

AGRARIAN CODES

The 6-year social and economic plan, adopted as the platform of the National Revolutionary Party in 1933, was designed to add impetus to the agrarian reform and to enable the State to take a more active part in agricultural development. Soon after the new administration came into power in 1934, the plan was legalized in the agrarian code, and a new Agrarian Department was created to replace the old National Agrarian Board. For the first time, the villages within the hacienda system were included in the reform, and wage-paid workers, as well as lessees, crop tenants, and sharecroppers, were privileged to join a group of petitioners within a radius of 7 to 10 kilometers (4 to 6 miles) from the hacienda.

Under the decree (January 15, 1934) creating the Agrarian Department, provision was also made to set up Agrarian Mixed Commissions of five members to replace the State agrarian commissions. The whole procedure for acquiring land grants was simplified and the time shortened. Land could be obtained by restoration, donation, increase in the area of previous grants, and creation of new centers of rural population.⁵ At least 20 qualified persons were required before a petition for a land grant could be filed, either with the State governor or the Mixed Agrarian Commission.

Any private property within a radius of 7 kilometers from a petitioning community is subject to expropriation, but the owner may retain for his own use any 100 hectares (247 acres) of irrigated land and 200 (494 acres) of seasonal land, or their equivalents. Certain other lands devoted to specified crops may also be exempted from the provisions of the code.

After the adoption of the code, both the number and area of definitive grants surged upward sharply until 1937 (fig. 1), after which they de-

⁴ See p. 205 of reference cited in footnote 1.

⁵ See p. 218 of reference cited in footnote 1.

clined. Part of the land so granted to a village is set aside for schools, recreation areas, wood lots, etc., which all ejidatarios must support. In most cases each petitioner receives a plot of ground, which is chosen by lot, and which cannot be mortgaged or sold. In other cases, the ejido is farmed by organized collective labor. These are State-directed agricultural enterprises. One of the first and most important of the collective type is located in the Laguna region of the States of Coahuila and Durango. The land was expropriated under a decree of October 6, 1936.

A law of late 1936 (signed November 23) extended the principle of expropriation to property other than land and advanced an amendment to the theory of private property. In effect this law sets forth a new juridical conception that property is no longer to be considered an absolute right but rather a social function, thus permitting expropriation to be effected not only for reasons of public utility but also for reasons of social interest.

During the period of the first 6-year plan, land expropriation and grants to ejidos reached their

height. The code of 1934, with various modifications, remained in effect until 1940, when a new code was adopted (effective November 13) and a second 6-year plan inaugurated under the Ávila Camacho administration. The new code retained the principles enunciated in the earlier version but modified procedures somewhat. It was supplemented by a decree granting to a peon definite title to the land given him, although prohibiting him from selling or mortgaging the land. Still another code was enacted 2 years later, making further modifications in the existing laws (published in *Diario Oficial*, April 27, 1943). It increased the unit of land to be parceled to individual ejidatarios to 6 hectares (15 acres) of irrigated land and 12 hectares (30 acres) of other land for the new ejidos and permitted enlargement of the parcels of the established ejidos. In addition to outlining procedures for issuance of certificates of agrarian rights and other regulations, it permitted the establishment of new livestock ranches, notwithstanding the rights of the peasants to obtain needed lands.

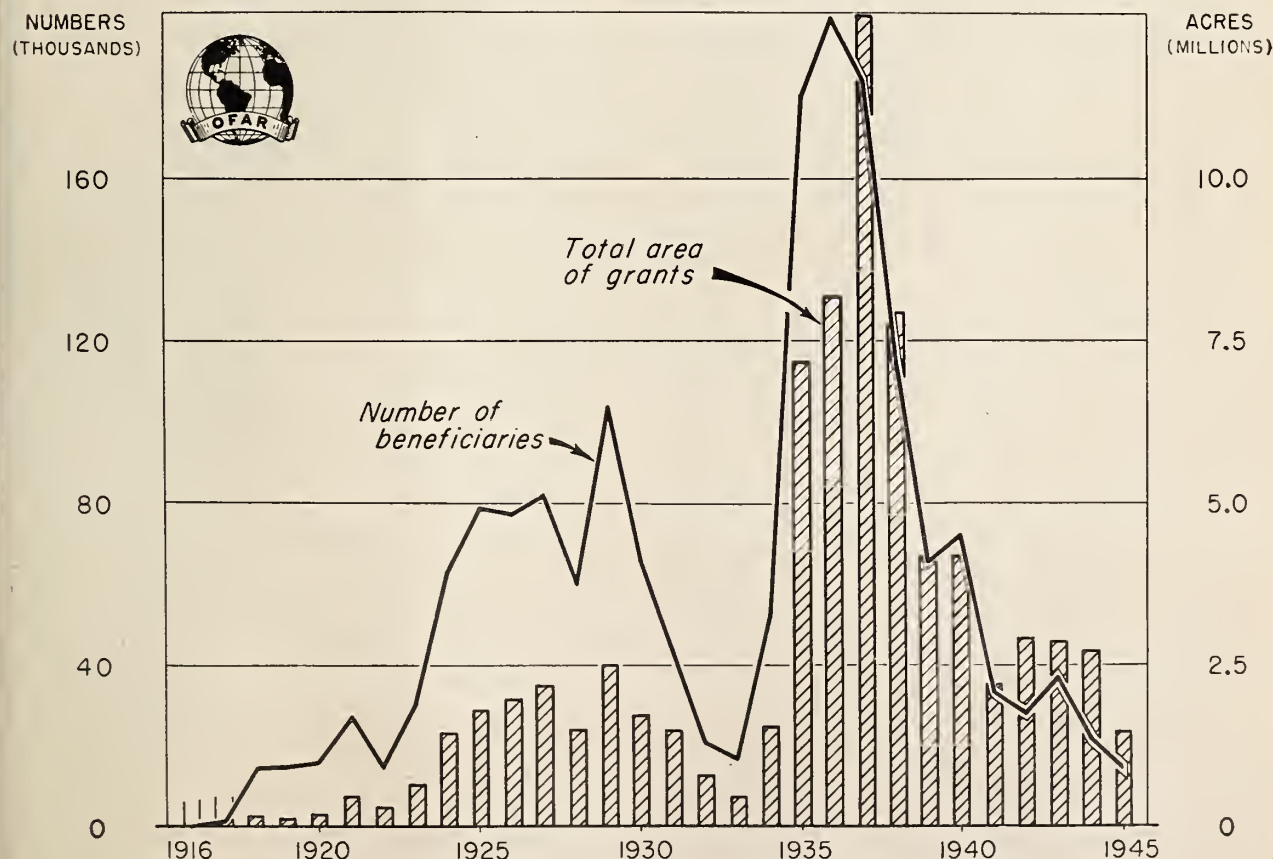


FIGURE 1.—Number and area of definitive ejidal grants in Mexico, 1916-45

The ejido program developed by Mexico took advantage of the heritage of village organization associated with precolonial culture. This program is uniquely Mexican and differs from land-reform measures in many other countries. As the agrarian policy developed, Mexican leaders more and more realized that land distribution is not a sole solution for the agricultural problem, but that it must be accompanied by other benefits if it is to be successful. Land reform still remains, however, a cardinal principle of Government policy. President Ávila Camacho in a speech on May 14, 1945, while recognizing that mistakes had been made, went on to say:

It [the agrarian work of the revolution] is a historic fact which we shall not be able to tear from our Republic without at the same time tearing from our conscience all the problems and all the hopes which stimulate us to exist and to fight to exist.

The Six-Year Plans

Although the revolution of 1910 had verified the sharp break with the old ways of doing things and the constitution of 1917 had laid the legal framework for liberal reform, progress was disappointing during the first 23 years of the new regime. Toward the end of 1933 the Mexican Revolutionary Party adopted a plan of social and economic development to be carried out during the following 6 years by the incoming administration. This plan covered the agrarian program and included provisions for labor legislation, construction of communications and public works, and improvement in foreign relations as well as in the national economy. The first of these was directly related to agriculture, and most of the other topics contained references to agricultural assistance.

Progress was speeded up, particularly with reference to agrarian reform, and 6 years later a new plan was drawn up and adopted. It was even more comprehensive than the first and embodied several new principles enunciated during the operation of the first plan. Chapter I on land distribution and agricultural production reiterated the Government's adherence to agrarian reform measures and the principle of ejido production and further provided for the promotion of natural resources, improvement in agricultural credit, equality of treatment for farm women, establishment of efficient means of marketing, and—

the organization of production and the distribution of the products so that these operations shall fulfill their social ends and lead to the social and economic improvement of the farmers and of the collective majorities.⁶

Again, the remaining chapters of the plan, while dealing specifically with other phases of the economy, make provision for benefits to agriculture, as in the case of road building in agricultural areas, legislation affecting agricultural laborers, and the direction of credit toward increased agricultural production.

Irrigation

Closely tied in with the principle of "land for the peasant," but following it in development, was the principle of the inherent right of the farmer to irrigation water. Because of the arid climate in many parts of Mexico, artificial provision of water to the land has long been practiced. The Indians had small irrigation systems of a sort long before the Spaniards came. After the large plantations were established, installations of private systems were made. Some of these were constructed with the assistance of the Loan Fund for Irrigation Works and Agricultural Development. The more important works were on sugar estates in the State of Morelos, on cotton plantations in the Laguna area, on sugar and vegetable lands in Sonora and Sinaloa, and in the Mexicali district of Baja California. Estimates indicate that a total of 1,730,000 acres had been placed under irrigation up to the time of the 1910 revolution.

In connection with the land-reform measures, the Revolutionary Government soon realized that one of agriculture's greatest needs was water for the thirsty lands. Accordingly, an office was established in 1921 (*Dirección de Irrigación*) to sponsor irrigation projects. It was not until 5 years later, however, that a serious Government effort was made in this direction. A law on irrigation of Federal lands was passed on December 2, 1925, followed by one enacted on January 9, 1926, declaring irrigation of private agricultural properties to be a public utility and authorizing the Government to construct irrigation works on private lands if the owners were unwilling to do so.

A National Irrigation Commission (*Comisión de Irrigación*) was created to carry out the provi-

⁶ LORWIN, LEWIS L. NATIONAL PLANNING IN SELECTED COUNTRIES. Natl. Resources Planning Board, Tech. Paper No. 2. 173 pp., illus. Washington. 1941. [Processed.] See p. 166.

sions of the act, and appropriations were included in the budget each year to finance the work. A special office (*Departamento de Pequeña Irrigación*) takes care of small projects and assists the State governments in constructing and improving small works throughout the country. The law of agricultural credit of December 2, 1935, placed the administration of the completed projects under the Agricultural Credit Bank. Later,⁷ however, the administration of the irrigation systems was withdrawn from the Agricultural Bank, and the National Irrigation Commission was made independent of the former administrator.

The engineers of the commission are making reconnaissance soil surveys throughout the country, as well as detailed soils maps of the specific projects. After the preliminary work is done and the actual installations are made, colonization of the reclaimed land is sponsored. The commission also introduces improved seed and better breeds of livestock, and its work includes soil-conservation practices, establishment of experimental farms and laboratories, road building, and swamp drainage. It makes special study of the hydroelectric possibilities in connection with the larger projects.

From 1926 until 1940 the Government spent 264,613,689 pesos (\$88,146,000)⁸ for irrigation benefiting 670,000 acres. Of this, new installations accounted for 387,000 acres, whereas improvements of old systems accounted for 283,000 acres.⁹ In 1940 plans were made for the following 6-year period calling for the expenditure of an additional 387,390,000 pesos (\$79,805,000) to benefit 1,735,000 acres of land. Of this area, 1,082,000 acres would be irrigated as a result of new projects, and 653,000 acres would represent the improvement of old systems, which would have brought the total area affected in the 20-year period to 2,405,000 acres (table 1).

Actually, expenditures the past few years have exceeded the proposed amounts under the plan. In addition to Federal expenditures, the State and local governments contribute toward the projects. Progress was made with difficulty during the war, however, because of the lack of machinery and supplies and the scarcity of labor.

Some of the larger projects which are com-

pleted or on which work is going forward include: Pabellón, State of Aguascalientes; El Mante, Tamaulipas; Don Martín, State of Michoacán; El Palmito, Durango; El Azucar, Tamaulipas; and La Angostura, Sonora (fig. 2). The Government does not expect to be reimbursed directly for the large subsidies granted for irrigation works. The benefits will come rather in increased agricultural production and higher levels of living for the farm population.

TABLE 1.—*Expenditures and area benefited by irrigation projects, proposed and actual, 1941-46*

Year	Expenditures			Area benefited					
	Proposed	Budgeted	Actual	Total		New projects		Improvements	
				Proposed	Actual	Proposed	Actual	Proposed	Actual
	Million dollars	Million dollars	Million dollars	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres
1941.....	11	11	11	218	99	83	71	135	28
1942.....	13	11	13	232	348	146	128	86	220
1943.....	14	17	17	245	205	171	140	74	65
1944.....	14	22	24	296	170	160	139	136	31
1945.....	14	30	-----	346	67	235	55	111	12
1946.....	14	39	-----	398	790	287	358	111	432
Total 1941-46.....	80	133	-----	1,735	1,679	1,082	891	653	788
Total 1926-40.....	-----	-----	88	-----	670	-----	387	-----	283

Compiled from official sources.

Agricultural Credit

Land and water were not enough to carry on operations, however, without credit. The Government entered this field also. One of the first Federal arrangements for extending credit to farmers was the establishment in 1908 of the Loan Fund for Irrigation Works and Agricultural Development by the National Bank of Mexico, the Bank of London and Mexico, and the Central Mexican Bank of Commerce and Industry. Later, in 1916, a Monetary Commission was established to provide credit for developing natural resources. Both these entities were financially unsuccessful and in reality did little to provide credit for farm operations. Some credit was made available by cooperatives organized under a Division of Agricultural Cooperation in June 1922. Other than these feeble attempts, however, all agricultural credit was handled by private lenders, including commercial banks, warehouses, trading companies, and individuals. Much of the credit advanced to smaller farmers and tenants was at very high interest rates.

⁷ *Diario Oficial*, December 2, 1944.

⁸ Yearly expenditures converted at average annual exchange rate and then totaled.

⁹ ORIVE ALVA, ADOLFO. PROYECTO DE PROGRAMA DE IRRIGACIÓN PARA EL SEXENIO 1941-46. *Irrig. en Mex.* 23(1): 5-25, illus. 1942.



FIGURE 2.—Map of Mexico showing location of irrigation projects undertaken during 1926-46

By 1926 the Government realized the inadequacy of the credit structure and enacted legislation creating the National Bank of Agricultural Credit (Banco Nacional de Crédito Agrícola) and regional and local agricultural-credit societies. The inadequate capital (the original capital subscribed amounted to \$9,812,000, only \$5,947,000 of which was in cash) and the operating policy of lending principally to the *latifundistas* (large landowners), however, combined to limit the benefit accruing to the small farmer and the ejidatarios.

The same year in which the bank was organized, the Secretary of Agriculture was authorized (March 16, 1926) to establish ejidal banks throughout the country, which could make loans to ejidatarios organized in cooperative societies.¹⁰ Although nine banks were set up under this authority,

the program was not considered a success, and the banks and the cooperatives were ordered liquidated on February 26, 1932.

An entirely new law was promulgated on January 2, 1931, to provide credit especially for small farmers and ejidatarios. It set up a National Bank of Agricultural Credit, regional banks organized by and associated with the National Bank, and agricultural cooperative societies and warehouses. Those farmers not organized into cooperatives had to depend on private credit facilities. In addition to the lending function, the new organizations had educational and social duties to perform for their clients.

Three years later lending authority was extended to include farmers not organized and to provide credit for large-scale projects of benefit to the whole area, such as the construction of silos, canals, and railroads; reforestation; electrification, etc. Again in late 1935 additional legislation created the National Bank of Ejidal Credit, designed spe-

¹⁰ See, for more detailed discussion, WOOSTER, JULIA L., and BAUER, WALTER. AGRICULTURAL CREDIT IN MEXICO. U. S. Dept. Agr. Bul. No. CR-4. 56 pp., illus. Kansas City, Mo. 1943. [Processed.] See also WOOSTER, JULIA L. THE MEXICAN AGRICULTURAL-CREDIT SYSTEM. Foreign Agr. 7: 27-38, illus. 1943.

cifically to aid the ejidatarios, and expanded the activities of the National Bank of Agricultural Credit to include colonization and administration of areas being irrigated by the Government. A new agricultural-credit law (December 23, 1942, in *Diario Oficial*, March 27, 1943) modifies the previous legislation somewhat and aims at a better integration of the whole credit system.

Capital stock for both the agricultural banks is subscribed by the Federal Government, the State governments, and the local societies or individual borrowers. Since 1941 both banks also have had rediscount privileges at the Bank of Mexico. In addition, the National Bank of Foreign Trade, created in 1937 to promote exports, particularly of agricultural products, provides funds to the two banks to encourage specific programs and also makes direct loans to marketing associations or cooperatives from time to time.

The local credit societies through which the two agricultural banks may operate are authorized to make four types of loans to their members: (1) Commercial or short-time loans secured by warehoused crops or granted on a character basis under the signature of two persons; (2) *avío* or production loans for periods not exceeding 18 months to finance the production of a crop; (3) *refraccionario* loans made for periods of from 1 to 8 years for the preparation of new land for cultivation, purchase of equipment, etc., with the privilege of an extension to 12 years in cases of plantations not coming into bearing for 5 years; and (4) *inmobiliario* loans for the purchase of land, or permanent improvements, for periods not to exceed 30 years. Individual farmers may not obtain commercial loans direct from the National Bank of Agricultural Credit but are eligible for the other three types under specified conditions.

No statistics are available on the total amount of agricultural credit outstanding in Mexico; so it is impossible to judge the proportion supplied by the Government-sponsored institutions. An estimate made in 1940 showed that loans by private banks amounting to \$28,706,000 were classified as agricultural. Part of the money loaned to wholesalers, warehouses, etc., however, probably was relented to farmers. In that year the two agricultural banks loaned \$13,312,000. By 1945 this figure had increased to an estimated \$27,711,000, 80.8 percent of which was loaned by the National Bank of Ejidal Credit.

As a result of wartime pressures to increase agricultural production, additional facilities for obtaining credit were made possible by the establishment of a fund to guarantee from 15 to 100 percent (depending on the type of loan) of the loss resulting from loans to farmers by private banks. Funds for agriculture are also available in connection with the operations of a semi-Government corporation (*Nacional Reguladora y Distribuidora, S. A. de C. P.*), which regulates certain production and marketing practices.¹¹

Farm Organization and Extension

In order to make the most of the services being rendered in the field of agriculture, the farmer must know how to use them to best advantage. Progress in training technicians and in teaching the farmer new ways of doing things has been slow, but a start is being made.

IMPROVEMENT OF FARMING PRACTICES

Only a small number of farmers in Mexico follow so-called modern farming practices, although an increasing proportion of the commercial producers have the advantage of improved techniques and equipment. No agricultural extension or demonstration service, as such, exists in Mexico. The need is felt in Government circles, however, for a larger number of highly trained agricultural leaders, as well as for a service to distribute scientific information to the farmer.

Although little headway has been made on a national scale, efforts are being made by the Government, through various agencies (including the Irrigation Commission referred to above), to aid the farmer in acquiring new skills and to make available to him fertilizers and machinery. Several machinery supply stations have been established to serve the ejidos, farm machinery has been imported and distributed by the Government from time to time, and technical advice is offered by the agricultural banks to their patrons. The National, State, and local Governments are all cooperating in a project to mechanize agriculture. The National Government also maintains a School of Agriculture for the training of technicians. The regular national and regional expositions and the cultural missions maintained by the Office of Education give

¹¹ Activities of this corporation will be discussed in a later article.

some farmer instruction. Federal-aid experiment stations have been established at numerous sites throughout the country.

One of the things that will do much in the long run to give the farmer a better understanding of possible new methods is the Government campaign against illiteracy. By decree of August 21, 1944, everyone from 18 to 60 years of age who can read and write must teach one other person within the age group of 6 to 40 to read and write.

COOPERATION WITH THE UNITED STATES

For many years the Mexican and United States agricultural agencies have cooperated in cattle-quarantine work; in controlling insect pests; and in exchanging technical plant material, personnel, and information. A joint commission works to eliminate the pink bollworm, so destructive to cotton on both sides of the border. The two Governments are maintaining a laboratory in Mexico City and cooperating in other ways to develop methods to control the fruitfly. A particularly important disease in both countries is stem rust of wheat. The United States Department of Agriculture has sent seed of wheat varieties resistant to this disease to Mexico, and the two Governments are working together to eradicate the alternate host plants and to breed new varieties of wheat. Cooperative and complementary research is going forward to develop improved sugarcane varieties, to provide better forest and soil management, and to make irrigation more effective in the two countries.

In many respects the agriculture of Mexico and that of the United States are complementary. During the past few years both Governments have taken steps to strengthen the complementary nature of the two economies. Cooperative experiment stations have been established to investigate the possibility of producing rubber in Mexico for the United States market. A station to study native guayule was located at Torreón, Coahuila; one for *Cryptostegia* at Ciudad Victoria, Tamaulipas, and one for *Hevea brasiliensis* is still operating at Palmar, Veracruz. Studies are being made of fiber, particularly henequen, and of *Sansevieria*, which might be used as a substitute for jute. The Government has been extremely helpful in fostering these as well as other experiments in producing crops in Mexico for sale to its northern neighbor. On the other hand, it recognizes the mutual benefits derived from the profitable ex-

change of Mexican products for those produced in the United States and entered into a trade agreement in early 1943 that looks toward this end.

Further agricultural cooperation is assured by the establishment of a Mexican-United States Agricultural Commission to encourage agricultural activities mutually beneficial to both countries. The Commission is the outgrowth of negotiations initiated in the summer of 1942. The first meeting was held in Mexico City in the summer of 1944, and the fourth meeting was held in California in the summer of 1946. The Commission's work so far has centered around the following major fields: Exchange of technical information, workers, and students and the training of agricultural technicians; improvement of crops and livestock and the establishment of uniform standards and grades; economic studies of special commodities; joint action to combat pests and diseases of plants and animals and the provision of quarantine measures; improvement of rural life and agricultural statistics; and the conservation of natural resources.

Outlook

As far as the basic structure and organization of agriculture are concerned, Mexico is committed to a policy of Government supervision and direction. Although the rate of land grants under the agrarian reform slowed down considerably during the second 6-year plan, the principal of ejidal production remains paramount. Continued assistance in the construction of irrigation works, provision of agricultural credit, and training of technicians is assured.

Even with an accelerated program in each of these fields, however, improvement in the total agricultural economy is likely to be slow and tedious. Progress in one direction is sometimes counterbalanced by losses in another. Lower production resulting from the confusion associated with changes in land tenure, for example, adds to the problems of food supply. Forward-looking legislation, too, sometimes is far in advance of accomplishment. The workability of some of the principles themselves remains to be proved. Providing the farmer with technical information on improved methods is one of the activities that will probably do most in the long run to raise the general level of agriculture in Mexico.

Egypt's New Agricultural Program

by ANIS AZER*

Egypt, traditional granary of Biblical days, was virtually independent in food production prior to World War II. Modern practices and techniques were, however, largely reserved for cotton—the outstanding export crop of the country. Now that the world is once more looking toward peaceful pursuits, Egypt's Minister of Agriculture, Hussein Enan Pasha,¹ forecasting important participation by the Kingdom of Egypt in what he terms a current "agricultural renaissance," has recently issued a detailed statement outlining the program of his administration.

Following the success of the Cotton Research Board, which has produced tangible results for Egypt, through the propagation of the long-staple cotton plant, the Minister has decided to organize similar boards to deal with cereals, horticulture, animal husbandry, and veterinary services. Heading the different groups will be career men who have devoted themselves to these branches of agriculture.

Enan Pasha places considerable reliance on new developments, especially from abroad. Agricultural attachés have therefore been sent to both the United States and England. Directors of the different technical sections of the department will be sent to various countries to visit research institutes and to check on matters of particular interest to Egyptian economy.

In the task of translating modern scientific developments into the Egyptian agricultural economy, model farms of 1 acre each are being established in various sections of the country. These farm units, embodying all the most modern methods, will be operated by the department of agriculture. Peasant farmers will be invited to come to them for observation and study of newer methods of farming. Training courses for foremen, gardeners, horticulturists, and others are to be operated in connection with these farms.

A modest growth of the cattle industry is presaged in plans of the department, recently announced. Small farmers will be given an op-

portunity to obtain at low cost choice breeds of stock to be paid for during a 5-year period. The Ministry has announced that past experience proves that, with the ownership of cattle, a higher standard of living inevitably follows.

In his recent statement, Enan Pasha emphasized the two fundamentals of the present Egyptian agricultural economy; first, the necessity for increasing the productivity of the land and, second, the need for expanding the acreage under cultivation. He pointed out that the population of Egypt was growing more rapidly than the agricultural areas were expanding; hence, the need for speed in bringing potential farm areas into production.

Increase of the agricultural areas depends upon the availability of water. The engineering problems, in charge of the Public Works Ministry, are being completely coordinated with the program of the Ministry of Agriculture.

In the reclamation of desert land, the key problem, it is pointed out, is the lifting of water from a depth of 8 to 10 meters (25 to 35 feet), because much of the land available has an abundance of water obtainable at this depth. Power to operate pumps would become available for this expansion, with the proposed development of Assuan Dam on the Upper Nile.

Special crops have been planned for the oases, with the growth and cultivation of olives and dates receiving particular attention. A plan has been proposed whereby half a million olive trees would be given to the Bedouins in order to encourage the further exploitation of oases by the desert population. Another plan includes special investigation of dry-farming areas, particularly in those sections lying close to the sea, where occasional rainfall is encountered.

As a vital keystone of the new intensified overall plan, Enan Pasha has adopted a program which would provide for a complete change of seed for all Egyptian land within a 5-year period. Pure seed, sufficient for a half acre, would be supplied by the Government; the tenant would expand this himself so that a 5-year change of seed would result. Large landowners, with holdings in excess of 50 acres, have already been provided with good

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¹Enan Pasha is a career official in the field of agriculture, having been identified with the department of agriculture in his country for upward of 30 years. His first post was that of a technical official in the botanical division. For the past 9 years he has been the chief executive officer of the department.

seed; the new plan would bring it within the reach of the small landowners.

Three large new stations for testing and certifying seed are contemplated. These would follow the same plan as that prevailing for the cotton growers. An extensive botanic garden is planned for the testing of new plants from tropical and subtropical regions, with the hope of finding new economic crops and expanding Egypt's range of products.

Of profound importance to the people of Egypt is the necessity for increasing the number of small

farmholders, according to Enan Pasha. Egypt wants neither very large nor very small holdings. The Government plans to assist the small holder in the acquisition of reclaimed land. In this, the cooperation of large landowners, with holdings in excess of 50 acres, would be sought in order to provide acreage for the needy at reasonable rates.

All these plans, according to Enan Pasha, are in consonance with the recent program directed toward increasing the standard of living of the masses of Egypt as promulgated by His Majesty, the King of Egypt.

World Fats and Oils Production and Trade*

World production, trade, and consumption of fats and oils have increased materially during the past four decades. Expansion in demand has been due, in part, to increased population and, in part, to technological developments leading to increased per capita utilization, particularly of vegetable oils and whale oil. During World War II, blockades, enemy occupation of producing areas, and inadequate shipping seriously curtailed production and consumption and depleted stocks. In 1946, production is still relatively small, whereas the demand is strong.

Total world production of visible fats and oils available for consumption in 1946 is estimated to be about 20 percent smaller than the 1935-39 average. The total quantity available for international trade in 1946 is estimated at about 3 million short tons as compared with 6.5 million, the average amount moving annually from original sources during 1935-39.

Production

World production of fats and oils in 1945 was placed at 17,300,000 short tons, compared with the prewar (1935-39) annual average of 21,600,000 tons. Production of every group of fats and oils was below the prewar level (table 1). The great-

est reduction in output was in the palm oils (coconut, palm oil, and palm-kernel); this has occurred in the Netherlands Indies and the Philippines, formerly two of the major producing areas. Marine oils were also substantially below prewar production. The 1945 production of edible oilseeds was only about 10 percent below the prewar output. In the edible group, the greatest declines were in cottonseed and olives, attributed, respectively, to the reduction in cotton acreage and to the 1945 drought in the Mediterranean Basin. On the other hand, sunflower-seed production exceeded the prewar level. In fact, the two phenomenal developments in vegetable-oilseed production that occurred during the war were expansions in Argentine sunflower-seed and United States soybean production.

Fats and oils available for consumption in 1946 are those obtained largely from the oilseed crops and olives harvested in the fall of 1945 and from animal fats, marine oils, and palm oils from the current year's production.

The production of palm oils is expected to be some 200,000 tons greater this year than in 1945. The increase is largely the result of the rehabilitation of the copra industry in the Philippines, where the output this year is expected to equal more than 50 percent of the prewar average. Small quantities of copra are expected also from the Netherlands Indies, but the total annual output of palm oils this year will be at least 1 million tons below the prewar level.

*This article is a summary of Foreign Agriculture Report No. 11, a detailed study prepared by staff members of the Fats, Oils, and Rice Division, International Commodities Branch, Office of Foreign Agricultural Relations and published in August 1946.

TABLE 1.—*Fats and oils: Estimated world production,¹ average 1935–39, annual 1945*

Commodity	Total in oil or fat equivalent	
	Average 1935–39	Estimate 1945
Edible oils:	<i>1,000 short tons</i>	<i>1,000 short tons</i>
Soybeans.....	1,360	1,240
Sunflower seed.....	630	865
Peanuts.....	1,615	1,660
Cottonseed.....	1,675	1,150
Olive oil.....	960	575
Sesame seed.....	675	565
Total.....	6,915	6,055
Palm oils:		
Copra.....	1,610	700
Palm kernels.....	375	275
Palm oil.....	670	315
Babassu kernels.....	30	35
Total.....	2,685	1,325
Industrial oils:		
Flaxseed.....	1,170	1,165
Castor-beans.....	200	205
Rapeseed.....	1,365	1,335
Oiticica oil.....	10	15
Tung oil.....	150	90
Perilla seed.....	65	50
Total.....	2,960	2,860
Animal fats:		
Butter.....	3,750	2,835
Lard.....	3,000	2,400
Tallow.....	1,400	1,600
Total.....	8,150	6,835
Marine oils:		
Whale.....	585	40
Fish.....	315	160
Total.....	900	200
Estimated world total.....	21,610	17,275

¹ The production for each commodity was determined by estimating the percentage of each used as visible fats and oils. Allowances were made for seed, feed, and oilseeds consumed directly for human food. Since export figures are the only reliable data available, for most palm oils an additional percentage was added for local consumption in order to arrive at total production. The following percentages were used in arriving at total production of visible fats and oils:

Commodities	Percentage
Copra, palm oil.....	125
Palm kernels.....	110
Olive oil, babassu, oiticica, tung, lard, tallow, whale, and fish.....	100
Castor-beans.....	95
Sunflower seed, rapeseed, flaxseed, perilla.....	90
Sesame.....	85
Butter.....	81
Cottonseed.....	75
Soybeans.....	65
Peanuts.....	60

The 1946 world production of animal fats is expected to be slightly below that of 1945 and about 15 percent below the prewar level. The reduction is due, in large measure, to the decline in butter production in Europe and the United States. The total lard production is also somewhat below the prewar level on account of the reduced hog numbers in European countries.

The 1946 whale-oil production, estimated at 160,000 tons, is much larger than that of 1945 but is equal to only about 25 percent of the 1935–39 output. The 1946 fish-oil yield is also estimated at only about 50 percent of the prewar level.

International Trade

World War II disrupted normal trade in fats and oils to a greater extent than production. By the middle of 1940, continental-European countries, normally importers of over 2 million tons, were largely cut off from prewar import sources. Following Pearl Harbor and Japanese occupation early in 1942 of the principal oilseed-exporting areas in the Far East, Japan controlled the countries which formerly contributed about 35 percent of the international trade. From 1942 to 1944, only about 2.5 million tons of fats, oils, and oilseeds, in terms of oil, annually entered foreign trade, compared with the prewar average of 6.5 million tons.

The total supply available for meeting the 1946 import requirements is estimated at less than 3 million short tons, but, because of delayed Argentine exports, all of this cannot be moved. The greatest shortage, as compared to prewar trade, is in the group of palm oils. (See table 2.) A tremendous decline in the supply of edible vegetable oils available for trade movement is also apparent. Reductions in all commodities of this edible group are evident, with the exception of sunflower oil.

The import requirements for fats and oils in 1946 are about double the supply available for export. The demand in Europe exceeds that of the prewar years on account of the sharp decline in production of animal fats and butter, the reduced oilseed production in the Balkan countries, and the small 1945 Mediterranean olive harvest.

International trade in fats and oils this year, as well as during the past 4 years, is being influenced by allocations recommended by the International Emergency Food Council (formerly the Combined Food Board) in an attempt to arrange equitable distribution of export supplies and to prevent severe competition among importing countries for supplies available. Otherwise, with the present world-wide shortage, the countries best able to arrange purchases could obtain the bulk of the available fats and oils.

Outlook

The expectation is that 3 years or longer may be required for world production again to reach the 1935–39 level. Several factors are retarding the rise in production of various commodities to their prewar volume. On account of political

unrest, it may take some years to restore Manchurian soybean production and the Sumatra palm-oil output. Whale-oil production is not expected to reach the prewar level; to guard against depletion of whales, a possibility conceded before the war, international agreements now limit the annual catch in the Antarctic to about one-half the 1938 level.

TABLE 2.—*Fats, oils, and oilseeds: Total exports from the principal producing countries, in oil or fat equivalent, average 1935–39, annual 1946*

Commodity	Total in oil or fat equivalent	
	Average 1935–39	Estimate 1946
	1,000 short tons	1,000 short tons
Edible oils:		
Cottonseed.....	190	35
Olive oil.....	174	10
Peanut.....	852	385
Sesame.....	65	15
Soybean.....	440	60
Sunflower.....	32	90
Total.....	1,753	595
Palm oils:		
Coconut.....	1,289	450
Palm kernel.....	342	250
Palm.....	535	265
Babassu kernel.....	20	25
Total.....	2,186	990
Industrial oils:		
Linseed.....	714	320
Castor.....	101	100
Rapeseed.....	45	10
Oiticica.....	4	10
Tung.....	189	30
Perilla.....	40	0
Total.....	993	470
Animal fats:		
Butter.....	2460	285
Lard.....	190	330
Tallow ²	195	110
Total.....	845	725
Marine oils:		
Whale.....	584	160
Fish.....	170	50
Total.....	754	210
Grand total.....	6,511	2,990

¹ 1933–37 average.

² 1934–38 average.

On the other hand, the expanded sunflower-seed production in Argentina is expected to continue.

The United States lard and soybean production will probably remain for some time above the 1935–39 level. Furthermore, several countries may subsidize domestic production in order to reduce import requirements.

The quantity of fats and oils available for international trade may remain below the 1935–39 level for some years, because several producing areas, such as India, may consume a larger quantity of domestic production. On the other hand, the import demand may not absorb so large a volume. The postwar demand is likely to follow a slightly different pattern than that of the 1930's. The demand in the Latin American countries, as a group, may be at a high level; at least, for a few years on account of the increased buying power. In the United States and Canada, the postwar industrial activities should create a strong demand for both edible and industrial oils. In Europe the demand is expected to be varied. The United Kingdom, the Soviet Union, and some of the smaller countries will undoubtedly have a high industrial activity and a strong demand for fats and oils. On the other hand, recovery in Germany may be slow.

World production of fats and oils is expected to expand during the next few years despite the prospect that decline in prices may occur within that period. How soon it will be before production exceeds demand at current prices depends upon many factors, such as: (1) Weather conditions affecting production in the major producing areas; (2) political stability in such areas as Manchuria and the Netherlands Indies, which will affect the volume of available supplies; and (3) the ability of the deficit countries to finance their imports. Furthermore, if world prices advance to an unreasonably high level, import requirements will shrink rapidly and a temporary surplus of fats and oils would appear likely.

Soviet Cotton-Production Plans

by LAZAR VOLIN*

Plans have been approved by the Soviet Government to increase cotton production, which declined greatly during the war. The intention is not only to recoup the losses of wartime but to exceed the prewar production level. Particular emphasis will be placed on raising the yield of cotton in the regions where it is grown under irrigation, notably the Uzbek Republic (Uzbekistan), which before the war supplied about 60 percent of the cotton crop of the Soviet Union.

A special program to increase cotton production in Uzbekistan, the principal Soviet cotton-growing region, has been formulated by the Soviet Government.

In 1938, the area under cotton in the Uzbek Republic had reached 2,266,000 acres, and the yield of seed cotton per hectare averaged 16.4 quintals, equivalent to 468 pounds of lint per acre. During the war, both acreage and yields of cotton decreased, according to official figures. The yield per hectare in 1943 was only 7.1 quintals of seed cotton, equivalent to 203 pounds of lint cotton per acre. It increased by 1944 to 11.3 quintals and by 1945 to 12 quintals of seed cotton, equivalent to 323 and 343 pounds of lint cotton per acre, respectively.¹ (See table 1.)

The lack of commercial fertilizers during the war was a very important factor in this sharp decline in yields just as the increased application of fertilizer was largely responsible for the great increase in yields during the prewar period. The importance of commercial fertilizer in the cotton economy of Uzbekistan was enhanced by virtue of an abnormally small use of manure, despite the large acreage planted to alfalfa, which should have provided a good supply of forage for livestock and, consequently, of manure.² But little

manure was actually obtained, primarily because of the shortage of grain straw for bedding, which resulted from the displacement of grain by cotton in this region. This situation was remedied to some extent during the war, when grain was introduced into the typical cotton-alfalfa rotation.³

TABLE 1.—Area, yield, and production of cotton in Uzbekistan, annual 1938, 1943–45, and planned 1946, 1947, 1953

Year	Acreage	Yield		Production of lint cotton
		Seed cotton	Lint cotton ¹	
	1,000 acres	Quintals per hectare	Pounds per acre	1,000 bales of 478 pounds
1938.....	2,266.4	16.4	468.2	2,220
1943.....	(2)	7.1	202.7	(2)
1944.....	(2)	11.3	332.6	(2)
1945.....	(2)	12.0	342.6	(2)
1946 ⁴	2,013.9	15.0	428.3	1,804
1947 ⁴	2,223.9	17.0	485.3	2,258
1953 ⁴	2,471.0	25.0	713.8	3,690

¹ Converted from quintals on the basis of 32 pounds of lint to 100 pounds of seed cotton.

² No figures available.

³ Not strictly comparable with 1938 and preceding years because of a change in estimating methods in 1939.

⁴ Plan.

Compiled from official sources.

The cotton acreage in Uzbekistan also decreased during the war, but no specific figures were published for the years 1942–45. A new Government program, published on February 3, 1946, specifies the 1946 acreage under cotton in the Uzbek Republic as equivalent to 2,014,000 acres, which is still 252,000 acres short of the 1938 figure. The yield in 1946 is expected to increase by 25 percent, compared with that in 1945, and is forecast at 15 quintals of seed cotton per hectare, equivalent to 428 pounds of lint cotton per acre. Should this planned yield materialize, it would still be 9 percent below the 1938 figure.

The final goal of this program for the Uzbek Republic, to be reached in 1953, is a cotton area of 2,471,000 acres and a yield of 25 quintals of seed cotton per hectare, equivalent to 714 pounds of lint cotton per acre. This would mean an increase of 9 percent in acreage, compared with 1938, but over 50 percent in yields. In the new cotton program for the Uzbek Republic, measures are prescribed for better utilization and increased area of the irrigated land; for an adequate supply of fertilizers.

*Office of Foreign Agricultural Relations.

¹ It should be noted that official instructions on estimating cotton and other major industrial crops, issued in the summer of 1939, required that the cotton which remained unpicked in the bolls or which fell to the ground be included with the cotton actually picked. In view of this, figures for the years subsequent to 1939, and perhaps also for 1939, are probably not fully comparable with those for the preceding period, when presumably the "barn" production of cotton actually picked was the object of crop estimates. Thus, the decline may have been even greater than indicated above.

² On January 1, 1938, there were 381,400 horses and 1,410,900 head of cattle in Uzbekistan, compared with 550,200 and 1,718,600, respectively, in the summer of 1928. The smaller number of livestock was not, however, responsible for the scanty use of manure.

³ For a detailed discussion of this problem see PRIANISHNIKOV, D. N. SOME WARTIME AGRICULTURAL PROBLEMS IN THE SOVIET UNION. Foreign Agr. 9: 146–150. 1945.

including construction of fertilizer plants, and agricultural machinery; for training of agricultural specialists, etc. Increased grain supplies to be sold to the cotton growers and some tax relief are also provided in the program.

One should bear in mind that this program applies to the Uzbek Republic only, and one should not confuse it with the recently promulgated fourth 5-year plan of the Soviet Union. The latter called for a production goal in 1950, for the country as a whole, of 3,100,000 tons of seed cotton, equivalent to 4,575,000 bales of lint cotton, or about 47 percent more than the 1934-38 average and 144 percent above the small 1945 crop, according to the following official figures:

Period	Acreage, million acres	Production 1,000 bales of 478 lbs.
Average 1934-38	5.0	3,114
1945	3.0	1,878
1946 ¹	3.2	2,453
1950 ¹	4.2	4,575

¹ Planned.

The expectation is to achieve this production goal with a total cotton acreage about one-fifth smaller than that in 1938. On the basis of the specified yield of 18.4 quintals of seed cotton per hectare, or 525 pounds of lint cotton per acre, the 1950 acreage figure would be 4,164,000 acres compared with 5,147,000 acres in 1938, the last year for which detailed data by regions are available. This decrease of some 983,000 acres will apparently take place, primarily, at the expense of the nonirrigated cotton area of Southern Ukraine, Crimea, and southeastern European Russia, since the plan calls for an irrigated area devoted to cotton which will be only slightly smaller than in 1938, and no mention is made of the nonirrigated cotton. (See table 2.)

The above-mentioned nonirrigated cotton-growing regions in 1938 accounted for 1,267,000 acres, or 25 percent of the total Soviet cotton area. They produced, however, less than 10 percent of the cotton crop. Cotton growing in these nonirrigated regions began, as a result of Government policy, only in the 1930's and is, therefore, of a much more recent origin than that in the irrigated regions of Soviet Central Asia (which includes the Uzbek Republic) and Transcaucasia.

TABLE 2.—Area under cotton in the Soviet Union, 1938, 1939, and 1950

Region	1938	1939 (plan)	1950 (plan)
	1,000 acres	1,000 acres	1,000 acres
Irrigated:			
Central Asia:			
Uzbek	2,266.4	2,254.8	2,360
Turkmenia	380.5	370.2	358
Tadjik	272.6	261.9	264
Kazakh	272.3	272.1	210
Kirgizia	158.1	158.1	131
Transcaucasia:			
Azerbaidjan	482.6	463.8	383
Armenia	42.3	39.0	37
Georgia	5.2		2 [5]
Total	3,880.0	3,819.9	3,748
Nonirrigated	1,266.8	1,295.3	416
All cotton	5,146.8	5,115.2	4,164

¹ Actually planted 941,000 hectares, or 2,325,000 acres.

² Area not mentioned; assumed to be the same as in 1938.

Compiled from official sources.

Yields of cotton were considerably lower in nonirrigated than in the irrigated regions. In 1937, for instance, yields in the nonirrigated regions averaged 4.6 quintals of seed cotton per hectare, equivalent to 131 pounds of lint cotton per acre, as against 14.5 quintals, or 414 pounds of lint cotton per acre, in the irrigated regions. There was often a great deal of inferior bolly cotton (that is, cotton in which the growth was stopped by frost before the bolls were fully matured) in these new regions, which are located farther north than the old area of irrigated cotton growing. Furthermore, the high-cost cotton from the nonirrigated regions was reported to be not entirely satisfactory to the Russian textile industry, because the fiber was too short. This cotton was primarily No. 1306, a variety developed originally from the American King type, and useful because of its early maturity in these northern regions, characterized by a short growing season.

Practically all the nonirrigated cotton-growing area was in the zone occupied by the Germans during the war and produced little, if any, cotton. Judging from the figures of the plan, apparently there is no intention to resume cotton growing on the former scale in these relatively low-yielding, high-cost regions. Shortage of manpower in this war-ravaged area may also have had an important bearing on the decision to reduce the nonirrigated cotton acreage.

